What is claimed is:

1. A voltage controlled oscillator comprising:

a resonance unit having first and second output terminals, for causing oscillations to output complementary alternating-current signals from said first and second output terminals, said resonance unit comprising:

an inductor connected between said first and second output terminals;

a first variable capacitor connected in parallel with said inductor;

a second variable capacitor having one of its electrodes connected to said first output terminal;

a third variable capacitor having one of its electrodes connected to said second output terminal;

a first switch for switching the other electrode of said second variable capacitor between floating and being subjected to a third potential;

a second switch for switching the other electrode of said second variable capacitor between floating and being subjected to a fourth potential different from said third potential;

a third switch for switching the other electrode of said third variable capacitor between floating and being subjected to said third potential; and

a fourth switch for switching the other electrode of said third variable capacitor between floating and being subjected to said fourth potential; and

an amplifying unit for fixing a high level potential and a low level potential of the signals output from said first and second output terminals to a first potential and a second potential lower than the first potential, respectively, wherein said first and third switches cooperate with each other to switch both the other electrodes of said second and third variable capacitors between floating and being subjected to said third potential, and said second and fourth switches cooperate with each other to switch both the other electrodes of said second and third variable capacitors between floating and being subjected to said fourth potential.

2. The voltage controlled oscillator according to claim 1, wherein said first variable capacitor is made of a varactor device to which a control voltage is input and which varies in capacitance in accordance with the control voltage.

3. The voltage controlled oscillator according to claim 1, wherein said second and third variable capacitors are made of varactor devices to which a control voltage is input and which vary in capacitance in accordance with the control voltage.

4. The voltage controlled oscillator according to claim 1, wherein said third potential is higher than the fourth potential, said first and third switches are P-channel transistors, and said second and fourth switches are N-channel transistors.

5. The voltage controlled oscillator according to

claim 1, wherein said first and third potentials are a power supply potential, and said second and fourth potentials are a ground potential.

6. The voltage controlled oscillator according to claim 1, wherein said inductor is a spiral inductor formed on a substrate.

7. The voltage controlled oscillator according to claim 1, wherein said amplifying unit comprises:

a first P-channel transistor having either one of its source and drain subjected to said first potential, the other connected to said first output terminal, and its gate connected to said second output terminal;

a second P-channel transistor having either one of its source and drain subjected to said first potential, the other connected to said second output terminal, and its gate connected to said first output terminal;

a first N-channel transistor having either one of its source and drain subjected to said second potential, the other connected to said first output terminal, and its gate connected to said second output terminal; and

a second N-channel transistor having either one of its source and drain subjected to said second potential, the other connected to said second output terminal, and its gate connected to said first output terminal.

8. The voltage controlled oscillator according to claim 1, wherein a plurality of capacitance switch units each comprising said second and third variable capacitors and said first through fourth switches are provided and

connected between said first and second output terminals, in parallel with each other.

9. The voltage controlled oscillator according to claim 1, being used as a local oscillator of a phase-locked loop circuit.